"Reflections on the Creation Debate - IBF events galore!"

CBF 31 May 2012 **Russell Clark**

Introduction

How would you respond if the following statement took over the communication channels of the world" scientists have come to a consensus position that we have been created by an intelligent agency and not by random chance processes!"?

Last week I indicated that I see no conflict between the ancient Biblical data on creation, with its emphasis on progressive development over time, its dependency on preceding events, the supply of information preceding various stages, and, with the creation story that science has been telling these past few decades. I ended by indicating that although scientific analysis can give a broad narrative and sequence of events, there are significant gaps in this account in terms of adequate explanations of mechanisms and causality.

The seven gaps that I find current explanations to be unsatisfactory are:

1 Big Bang from nothing

2 Order from a "bang"

3 Spontaneous generation of life on primitive earth

4 Development of eubacteria

5 Development of metazoa regulated by hormones and brains

6 Development of the human brain

7 A unique pattern for human ageing.

Following Professor C A Coulsen's warning in the 1955 John Calvin McNair lectures I wish to affirm that I do not support a "god of the gaps" view of creation. The Biblical position insists upon God's involvement in all aspects of creation, those bits we *may be able to explain* by current understanding of science (such things as the role of gravity, and of genetic change and adaptation, known popularly as evolution and natural selection), and those bits that *remain as gaps in our knowledge* .The Biblical presentation is not one of deism with a God who starts things, then departs, occasionally returning to keep things going. To the irritation of atheists, we cannot limit God and cannot tell God how He should behave in His creative activities. In humility we listen to what He may be pleased to reveal to us, and the Bible is content to let us know that we exist and have come into being through His loving intention. In Paul's letter to the Colossians we are told it has something to do with Jesus, the Son of God, "For by him all things were created, things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities, all things were created by him and for him." (Colossians 1:16). We have the privilege of looking back and trying to work out how He has done it.

It is a different matter for the atheist. If the atheist is to have any confidence in their dismissal of God and his involvement in our existence, they must be able to show there are no gaps in a scientific mechanistic explanation of our being. Just one gap can be fatal. My contention is that there are many, many gaps obvious to any thinking person who may care to explore for themselves. As indicated, seven stand out for me. How have these gaps been bridged?

Last week I left attachments for you to look at, at your leisure. I have even more today! Last week I gave a brief outline of the thinking about the Big Bang and how there is a silence with mathematics for events before $10^{-43}$of the first second of the creation, and some data and comments upon the amazing fine tuning of various physical constants, taken from a book by a Christian astrophysicist David Wilkinson, and from Paul Davies book" The Goldilocks Enigma" It was from the latter book that I chose the title of last week's talk as a choice between " shoulder shrugging" or " conversation stopping" . The worst comment Paul Davies could make about my position seemed to be that it stopped conversation and stopped further scientific interest in trying to find mechanisms for our creation. He told us that most scientists today accept a series of amazing flukes and shrug their shoulders at it! I also included extracts from, I think, the last book written by John Maynard Smith entitled "The Origin of Life". He has been a most influential atheistic evolutionist in Britain. From this book comes a list of eight major "transitions" which I prefer to call gaps. His transitions are not the same as my seven gaps, but as already indicated, there are many, many gaps! Interestingly, he considers that each of the transitions is bridged by transmission of information-from a DNA code to language. He suggests hypotheses, and I guess it is up to individuals to decide whether or not his suggestions could explain these transitions. I certainly think he fails, but is honest enough to admit difficulties and defects in current knowledge. He simply states that one day science will discover everything and warns against a simple trust in a creator God.

Today I wish to concentrate on Gap 3 in my list of gaps -the spontaneous generation of life on primitive earth.

I think we can truthfully say our ancestors were bacteria! It is a short term view to only look at chimps and gorillas! Some remarkable IBF events have occurred these past three or so billion years that cannot be explained by science. IBF stands for "Improbable But Fortunate". The question is: how did bacteria come into being?

I wish to address these matters under the following five headings

1 Abiogenesis has produced a living cell (life formed from none-life/inorganic chemicals)

2 DNA and protein exist, despite their mutual inter-dependence for initial existence

3 A universal code is found on one macro-molecule that controls all living entities

4 The DNA code is stable in living cells but not in-vitro

5 Transfer RNA is an absurd but necessary molecule. It is a “frozen accident” in the words of Francis Crick.

Is it a crazy thing to try to explain aspects of Biology and Biochemistry to lawyers at breakfast in 30 minutes? Probably! But I am frustrated that the points I make, that are accessible to every first year student in medicine and other related biological disciplines, are simply not known by the community at large. I would like you to hear these points!

1 Abiogenesis has occurred and abiosis has produced a living cell

(Abiogenesis is the formation of living beings from non-living chemicals; **abiois** is an abbreviated word meaning the formation of something without involving a living being)

Let me make five sub-points:

a) All the necessary chemicals, that are required for a living cell, cannot be constructed from the gases in the atmosphere of primitive Earth by modifying the environment (eg heat, electrical sparks, shock waves etc). Necessary ingredients for the construction of the most basic cell are missing, particularly lipids, especially phospho-lipids, required to form cell membranes to enclose the chemicals, and also ribose, required as an essential part of DNA. The much publicised experiments of Urey and Miller in the 1950's have been shown to be limited in what can be produced, and are probably irrelevant, as NASA has determined that the gases of primitive Earth were different from the ones Urey-Miller used. They used methane, ammonia, and water and achieved synthesis of many compounds, including amino acids. NASA has thought since the 1980's that the gases were carbon dioxide, nitrogen and water and these cannot produce any "building blocks" of macromolecules. Despite this state of knowledge and scientific certainty from multiple experimentation, this is not what is taught at primary schools onwards to universities. The impression is created that " science has shown all the building blocks of life came into being from the gases existing on primitive earth through physical forces that acted at that time" This is a lie, perpetuated even in John Maynard' Smith's book referred to-although he does admit to some of these difficulties. This is on page 2 of your attachment. .Look at Chapter 3 in Lee Strobel's book" The Case for Faith" and his journey of discovery about these matters. This is a book worth reading.

b) Water dissolves all bonds between amino acids and sugars. Even if the necessary 20 different amino acids and various sugars were present in the right proportions in the same place, proteins and DNA/RNA cannot form spontaneously in water. A primordial concentrated soup of whole proteins and DNA cannot be formed (as distinct from a soup of many smaller compounds eg amino acids). With time, water breaks down all macro-molecules. This is a daily experience for us all. Physiologically the process of digestion of the proteins, carbohydrates and nucleic acids (DNA, RNA) in the food we eat, is **water hydrolysis** (breaking of bonds by water), reducing macro-molecules to simple compounds. Digestive enzymes speed the process but it is the water that the breaks the chemical bonds. The surface of primitive Earth was essentially liquid water, exuded from the earth, and trapped by gravity preventing loss to space. The macro-molecules of life presumably would need to form in water, and persist in water, but proteins will not form, from amino acids

joining together with peptide bonds, in water. Acknowledging this, it has been suggested that the formation occurred at the water's edge, with tidal surges allowing drying by the sun. This does not solve the problem of water hydrolysis, once the proteins are dissolved by the next tide. You can read this on page 2 of the attachment, as "the primitive pizza". It is a different matter if **cells** have formed eg bacteria, as cells do persist and thrive in water, as they have membranes and cell walls that enclose and protect.

c) Despite detailed knowledge of a simple cell, and its biochemistry, it cannot be manufactured or simulated from component parts, not even any of the various sub-units eg mitochondria, ribosomes. Bio-engineering has not been able to make what theory or computer modelling suggests it should be able to make! Why was it possible for cells to appear some three billion years ago on the same surface of the Earth on which we stand, and not now when we can reproduce experimentally any and every type of environment? We can artificially create appropriate pressure, light, temperature, explosions mimicking meteorite strikes, electrical shocks mimicking lightning and we can supply gases in different concentrations, but cells will not form!

To claim that blind random processes can ever make a living cell over any time period requires the most extreme type of faith, or wishful thinking. This is illustrated by Cesar Emiliani in the attachment, page 1. I find his assertions unscientific and they discredit him and his book. He is simply using his authority, no doubt genuinely gained, to promote his wished for atheism. His statement that" anything that could happen, will happen given enough time" is simplistic. Computers and IT have happened also on planet earth -but intelligence has been required! All the components have all existed on our planet, but no computer did or will ever emerge without the extra ingredient of intelligence-this time our intelligence, as a species of animals-admittedly, bearing the image of God! Is it not possible that this specific intelligence came from God?

Abiogenesis has not been achieved by human effort, nor seen to have occurred spontaneously in the present scientific age of observation of natural phenomena. "Spontaneous generation", once accepted as being able to occur (partly because Christians can accept that "God can do anything"), has been strongly denied and ridiculed since the work of Louis Pasteur in the 19century, showed it was actually pre-existing bacteria that fermented the grapes, not God! To appeal to a gradual " forward" progression in the type and quantity of chemical molecules, so that finally a critical mass is present leading to assembly into a specific configuration that produces "spontaneous life" from non-life, is simply a sophisticated restatement of this discredited concept-but without God to make it happen! The ridicule remains but is redirected. Francis Crick (of Watson and Crick fame, Nobel Laureate for the structure of DNA) was defeated by this, and decided life on earth came from outer space on a meteorite. This is no solution at all to the difficulty-just a passing of the buck!

d) The manufacture of one living **cell** without a separate mechanism for replication/division/multiplication is of no value and cannot be called "living". That *initial* cell, with time, would simply stop reacting chemically eg like a spent battery. No realistic hypothesis, let alone, construction of a *replicating cell* from the beginning of the first cell, has

been developed. Scientists have tried and failed, despite our knowledge. Replication is an extra and very complicated step. Replicating or duplicating **molecules** do not constitute living organisms. These are simply chemical reactions. These are molecules doing what molecules do-form new bonds and new compounds. Thus such things as lengthening of RNA chains and duplicating/doubling of RNA chains through hydrogen bonding between bases will happen. This is not "molecular evolution". The end result is a modified polymer, like plastic polymers can lengthen and branch. Similarly, peptide chains (amino acids joined together) can change length (not necessarily through peptide bonds) although they cannot duplicate themselves in any way.

The mechanism of cell division is complex involving many genes and enzymes, even in the simplest living cell we can find today, such as the eubacteria and archibacteria. Cutting a cell in two does not produce two living organisms- just two dead ones!

e) Palaeontology has shown life as living cells became present on Earth probably within 500 million years of its formation, some 4.5 billion years ago. The probability that even one modest specific protein could form by some process of joining amino acids in a specific sequence, in such a short time period, is simply …. unlikely! For example, the well known small protein insulin has 50 amino acids in a specific sequence. Each amino acid location in the protein chain can be selected from 20 possible amino acids. Only one sequence will work. There are 20^{50} possible configurations. The probability of the correct sequence is one chance in 20^{50}. It seems fair to state that the correct amino acid sequence to form insulin through random sorting of a supply of amino acids in a short time period would not occur. The simplest living organism today (Mycoplasma- a bacteria without a cell wall) has 500 plus genes and 500 plus proteins. For all 500 genes and proteins to form with the specific sequences required, within just 500 million years, through random mixing of component parts must be declared as impossible!

Theoretically in a steady state *infinite* universe, anything that could happen possibly could happen. This may include even a sequence of improbable events, (that is what Emiliani states, page 1) but this does not apply to our time limited universe of just 13.7 billion years, let alone the shorter period of our planet (5 billion years), and the even shorter time period of half a billion years for the first life to occur on our planet.

Why is the faith of Christians mocked and not the faith of these atheist scientists?

Summary:

Spontaneous generation of life has happened. It should not have.

All the ingredients were not present; chemical bonding between macro- molecules is prevented in water; replication is a requirement from the first cell for life to be established; this requires a supply of DNA genes and proteins different from those involved in initial primitive life biochemistry.

Despite almost complete knowledge and theory of the biochemical processes of life, science has been unable to simulate abiogenesis and is currently defeated. There seems no

real prospect of this situation changing in the future. Attempts have been made but none with success. How is it possible for chance to do something we cannot simulate? Could a creator do better than chance?

2 DNA and protein exist, despite their mutual inter-dependence for initial existence.

Proteins are very large molecules consisting of many amino acids joined together. There are many types of amino acids (more than 300 found naturally) but only 20 are used for protein construction. Look at page 4. Sub-section (a) shows the chemical formula for various amino acids. I simply want you to see that there is a definite structure made from the atoms of C, H,O and N, and that it is nothing like a nucleic acid, with which you can compare in a minute. Amino acids are joined together by peptide bonds, as in sub-section (b), (c) and (d). The sequence of amino acids is critical for the function of a protein. Having initially formed one long string of amino acids, these may be twisted into a helix, as in sub-section (e) and (f) and then further folded into what is called a tertiary configuration as in sub-section (g). Look at these diagrams at your leisure! They come from a Biochemistry text.

DNA and RNA are examples of a very large molecule consisting of a long chain of sugar molecule (1,000's) joined by a phosphorus bridge and twisted as a helix. Look at page 5, sub-section (a). Attached to each sugar molecule is a cyclical molecule, either a purine or a pyrimidine, and collectively called a *nucleic base*. This is shown as the rectangle labelled "base". As these chemicals are found in a concentrated amount in the nucleus of a cell, they have been called "nucleic" acids. In sub-section (b) you will see there are two chains twisted together. This is the "double helix" Sub-section (c) shows that the two chains are joined together by hydrogen bonds and these form the ladder like structure of DNA. Sub-section (d) shows the four bases that are found in DNA.

The major difference between RNA and DNA is that RNA is a single twisted chain, or helix, and DNA is a double twisted chain, or double helix.

What I want you to see is that DNA/RNA, and proteins, are totally different from each other, and both are simply chemical molecules, sharing the same rules of chemistry as all other molecules. They both are made up of "building blocks"-amino acids for proteins and nucleic acids for RNA/DNA, and they both form long chains that can be twisted into different shapes. These molecules are interesting to look at (at least by chemists), but are essentially boring-just chemicals. I emphasise this as today the word "DNA" seems to be used to express all sorts of mystery and excitement.

And, of course, there is good reason for this, as these boring molecules somehow function in remarkable ways.

DNA/RNA in living cells contains a **code**, and because of this, acts as the manager/designer/controller of these other macro-molecules-the proteins. They assume a "boss -like" role in a cell.

Proteins exist in large quantities in cells performing many functions, some structural and some functional. They are *molecular machines* that make things happen, produce energy and

use energy for different functions. They are the "workers". They follow orders from the DNA- this hierarchy of "social organisation" is a remarkable thing for boring chemicals!

Biochemists can make both DNA/RNA and proteins with machines in the laboratory.

Despite many attempts, it is simply fact that neither DNA/RNA nor proteins, of the size and type /structure necessary for life, will form spontaneously by themselves from component parts.

In all living cells, proteins only form in a complicated way with an absolute requirement for DNA/RNA to direct and provide basic mechanical functions.

In all living cells, DNA/RNA only form under the action of specific and special proteins. These are protein enzymes, such as DNA/RNA polymerase which joins the base chemicals together to make the long DNA/RNA chain.

Life is not possible, including the first living cell, without both proteins and DNA/RNA being present together **from the beginning.**

It is convenient to simply speak of proteins as a class, but there are at least 500 different proteins in the simplest cell that can live. It is not enough to have a generic protein for a cell to live. The simplest cell needs 500 different types of proteins to perform the many different tasks required of cell, such as to provide energy, replace parts and to reproduce. No one protein can do the job of another. Each protein is a separate molecular machine performing a specific task in the cell. The use of the generic term "protein" to describe all these molecular machines is like the term" metal" to describe all the machines used in manufacture of an A380 Airbus! It is not enough to make one protein, it is necessary to make many very specific proteins, and only when they are all present will the cell "live", a process of perpetual chemical reactions plus replication!

By way of contrast molecules of DNA and RNA look very much alike-just a long twisted chain with only four parts that vary-the bases of adenine (A), guanine (G), cytosine(C) and uridine (U).They are not molecular machines like proteins. It is the sequence of the bases, the A, U, G, C arrangement that makes DNA/RNA unique. It is the code that comes from the arrangement of these bases those matters, not its structure or shape.

Summary:

DNA/RNA and proteins exist but science cannot explain their simultaneous origins.

No proteins, no DNA

No DNA, no proteins

3 A universal code is found on a macro-molecule that controls all living entities

Perhaps the most important discovery in Biology has been the discovery in the 1950's that the DNA/RNA not only has an interesting structure but contains a **code** that instructs another set of molecules to do something..

Every code known to mankind has been invented and designed by humans using intelligence. Written language, alphabets, mathematical symbols are all codes. Silicone has a code imprinted upon it to allow the wonders of the computer age. There are no codes in the inorganic world.

Blind/dumb/insensate molecules cannot assemble themselves in any way as to form a code that instructs an entirely different set of molecules to do something. Somehow, DNA instructs amino acids to join in a particular sequence to make a particular protein (humans have more than 50,000 different complex proteins)

Despite some attempts at theories, and some fanciful hypotheses, there is total failure to explain how such a code could form.

Have a look at pages 6 and 7 at home. See if that will help you understand how DNA as a long chain is divided into sections, so that some parts act as genes(the bits that give directions to make proteins) but most of the chain, although identical in structure, does not actually act as genes. Look at how this long chain must be folded in a very specific way so that 2 meters can fit into one tiny microscopic cell. Look at how this folding produces chromosomes. Look at the wonder of the universal code, using the four bases (A, G, C, U) grouped into patterns of three letters. This is a triplet code providing 4x4x4=64 possible combinations. The table shown on page 7sub-section (d) is the Rosetta stone of life. This is the link between DNA and proteins. Each triplet code matches one of the 20 amino acids used for protein construction. Look, be amazed and be humbled….but I must proceed.

Summary:

Certain boring specific chemicals found in living cells behave differently from all other chemicals because they contain a code that directs other chemicals to do things. It is not the structure of the molecule eg a double helix, that gives the code but the specific sequence of bases.

Only an intelligent agent acting on existing chemicals can imprint a code

4 Code stability Short chains (eg 200 bases) of RNA/DNA can be made abiotically (directly from chemicals not from living organisms), but over short periods of time (eg hours to days), the sequence of the bases changes, so that the code cannot be kept stable. This is easily demonstrated by in vitro experiments. Simply put, outside a living cell, stability of chains of RNA and DNA cannot be achieved. The code that bears, the recurring sequences of bases in a specific pattern cannot be maintained. The code becomes corrupt in hours.

Life requires **stability in the code** for heredity and for continuation of each cell function. Changes in the code are **mutations** and occur in both somatic cell (body) and germ cells (gonads). Most mutations are harmful. Mutations in somatic cells cause disease and death for the individual, and in germ cells cause disorders in the next generation, and ultimately extinction of the clone. Thus stability of the code is essential for survival of a species. Nevertheless, perfect stability would prevent variety of the species over a longer period (cloning producing identical copies of the parent)! Without mutations there would be no bio-diversity. Life would have stayed as one type of bacteria! Thus a critical balance of some degree of mutation is required, but not too much to produce extinction.

Somehow, a living cell maintains the correct amount of stability of the code. The correct amount will allow both survival of the clone, and over time, variation in the clone.

This is obviously an essential requirement for life. But how is it achieved?

The mechanism has been discovered..

Stability occurs because of another protein mechanism. These are enzymes called **"proof -reading" enzymes**-special proteins that work on the DNA to correct the errors that happen continuously. Mutations are part of the normal functioning of living cells because the DNA cannot maintain code stability. These errors are corrected almost immediately, so no harm comes from the mutation. These are an essential part of the DNA structure of every cell (the nucleus in our cells), and are present in all life from bacteria to multicellular organisms. This mechanism on first principles had to be present from the beginning of life on Earth, and the evidence is that this was so.

This insists on **anticipation.** Errors are anticipated and a system for correction is incorporated from the beginning.

Life (chemical reactions) for any period (eg a week!), and reproduction, producing generations, is only possible because of the presence of this proof-reading complex. This system was required for the first cell to survive and replicate. Without its presence, the code would not have been passed on accurately, leading to death and extinction of the clone

Once again, there is a simultaneous need for the presence of both DNA and protein in the first living cell on planet earth.

Summary:

No DNA, no protein. No protein, no DNA

No code, no protein. No protein polymerases, no code

No protein proof-reading enzymes, no stability of code. No stability of code, no continuation of life

5 Transfer RNA is an absurd but necessary molecule

Once the structure of DNA was determined, then the codes, then the way proteins are constructed in Biology, it was clear to Francis Crick that there must be a link between the DNA (made from bases) and proteins (made from amino acids). He predicted such a link and transfer RNA was satisfyingly discovered. Biology is rational and we have the gift of rationality to make sense of it all. Does this not suggest something about us being more than accidents?

Transfer RNA (tRNA) is a small RNA chain with a sequence of between 73-93 nucleotides (bases) that has the ability to attach one specific amino acid to one end of the molecule, and at the other end, to join to a specific site on a much larger RNA chain, known as messenger RNA (mRNA), through a code mechanism. Look at page 8 diagram (a). Although tRNA is a single chain it is folded into a specific shape, giving four arms. The specific amino acid attaches to the acceptor arm, and at the other end, the anticodon arm attaches to the messenger RNA in the ribosome.

Now look at page 9, diagram (a). This shows transfer RNA's loaded with their specific amino acids coming into the ribosome where proteins are made. The tRNA attaches through its code to a specific site on the mRNA. It is called the anticodon on the tRNA, and codon on the mRNA. This then allows at the other end of the tRNA, the amino acid to join as a peptide bond to the neighbouring amino acid. The tRNA then exits.

Looking at diagram page 9 (b) you can see in a simple form the process of protein synthesis. Each particular protein has a special sequence of amino acids, and the DNA code (equals a gene) has that sequence. The gene, marked as (1), transcribes this code onto a large RNA chain called messenger RNA. This mRNA once transcribed as (2) leaves the DNA with this transcribed code, travels to the ribosome in the cell cytoplasm (3), where proteins are made. This then acts as the template for each tRNA to line up in a specific order with each specific amino acid, so that a protein will be formed with the specific sequence of amino acids, as directed by the DNA gene. In the diagram you can see at (4) the tRNA collecting its specific amino acid, then travelling to the ribosome (5) where it bridges the link to the mRNA template with the amino acid chain (peptide chain). It then exits looking to repeat this activity (.6) "Conveyor belt" belt production lines are our engineering equivalents to this system.

It is much more complicated than this, but this simple description does not strike me as something that will just happen randomly!

However, there are three main points I wish to make.

1) tRNA had to be present for the first living cell to form and to function. tRNA is found in all living cells, from bacteria to us. It is universal. The structure is almost identical in all living entities. It is conserved from an evolutionary perspective. Crick called it a "frozen accident"

No tRNA, no life, as no linkage of the code on DNA with specific protein manufacturing.

How did it form? As with Section 2, no protein, no tRNA, no tRNA, no protein

2) There are 20 different specific tRNA's in all living cells, so there is one specific tRNA for each of the 20 amino acids that make up our proteins. As indicated already, there are more than 300 naturally occurring amino acids, but the tRNAs found react only with the 20 used for protein synthesis. The tRNA that joins glycine, for example, will not join to alanine-another amino acid. Yet the joining section on the acceptor arm of each tRNA is the same construction and the terminal sequence of nucleotides is identical for each tRNA. How is this specificity determined? It seems to have something to do with the cross arms, and another very specific protein enzyme that joins each specific amino acid to each specific tRNA.

How did this match develop in the first cell on planet earth?

3) The anticodon at the other end of the tRNA has a three letter code that specifies an exact amino acid, according to the code on page 7(d). Thus UUU (top line of table), is a sequence of three uridine nucleotides joined together and this is code for the amino acid phenylalanine. Thus the tRNA for phenylalanine has, at a very specific location at the anticodon site on the tRNA, where UUU occurs. It is easy to understand how the anticodon on the tRNA can now match the codon on mRNA, but how does this anticodon relate to the other end of the tRNA, so that a very different molecule, but a very specific molecule will join the acceptor arm? It is not understood.

Summary:

There remains a fundamental mystery today concerning the function of tRNA.

Yet tRNA function happens without ceasing, in all living cells in all of life on Earth.

How did it get that way? It seems God alone knows!

Conclusion

1 The Genesis narrative indicates God has brought life into being through information transmission after light and water impacted on our planet. Adam is made from dust in Eden. This information can accommodate the concept of abiosis-life from inorganic compounds. The Bible is silent about bacteria, I think for good reason. Such detail would be confusing and unnecessary theologically. Scientifically the evidence is strong that the first life was bacterial, probably both marine and terrestrial. The age of bacteria lasted several billion years, and achieved important changes in the gases of the atmosphere, making it possible for land animals to survive, and provided food resources for all living beings-fungi, plants and animals.

2 The great domains of archibacteria and eubacteria can be studied today, and much is known of their biochemistry, mechanisms of reproduction and energy requirements. Much of the basic biochemical mechanisms that are essential for us were first developed in bacteria, including protein synthesis using a code on DNA. Research into minimal requirements for bacterial life indicates a minimal number of specific protein enzymes and a minimal number

of genes must be present (around 500), enclosed in a cell membrane that allows permeability of nutrients. For bacteria dependent upon the energy of the sun there must be a minimum number of complicated proteins, directed by genes, allowing photosynthesis.

3 Simulation experiments at attempts to produce basic building blocks for proteins and carbohydrates have failed to produce usable compounds, and water prevents lasting bonds preventing the formation of proteins and nucleic acids. Fatty acids cannot not be made abiotically this way, so cell membranes required by bacteria cannot form. Despite almost a complete understanding of the mechanisms of bacterial biochemistry, and characterisation of the genes in the DNA, it has proven impossible to manufacture a living cell abiotically in the laboratory. *It begs the question as to why such an event should happen once spontaneously and randomly a few billion years ago on planet earth.*

4 If a cell did form containing active biochemical reactions, it also required mechanisms for division and multiplication, otherwise the effort was wasted. These mechanisms are complex. These chemicals cannot form abiotically. *The requirement for generative life compounds abiogenesis.*

5 Proteins that are functional are of a size and specificity that cannot develop apart from DNA direction through a code. In turn, DNA cannot obtain a sufficient size without the aid of protein polymerase enzymes. Both must be present at the same time and same place. *Separate development cannot happen.*

6 No testable mechanism exists to show how any code can form on DNA that gives direction for the formation of protein. Specifically, how triplet sequences using four nucleotide bases can indicate just 20amino acids necessary for protein construction from more than 300 amino acids present in nature. *It is a complete mystery*.

7 Both RNA and DNA are unstable in terms of maintaining a sequence of nucleotides, necessary to act as a stable code. There is an absolute necessity for the presence of protein proof-reading enzymes to be continuously active in association with DNA transcription and replication. *Protein proof-reading enzymes are required from the beginning of the first functioning of DNA.*

8 Transfer RNA (tRNA) must be present from the first living cell to transport specific amino acids attached to a receptor arm to the ribosome, and to link up with the code on mRNA using its specific matching anti-codon. There is no explanation for how this specificity based around the code can apply to the amino acid transported, not how such an arrangement could develop spontaneously in the first living cell. *It is a complete mystery.*

9 ***Does not this not make abiogenesis an enormous gap? If this cannot be bridged no life could have occurred on earth. Surely there is room for a creator?***

There are no other worthwhile explanations!